

# Helping Teachers Embrace Standards

One technology director describes how she adapted the National Educational Technology Standards for Students (NETS-S) and created assessment tools for her teachers.

By Darlene S. Cardillo

In my role as director of educational technology for a private school district in upstate New York, I eagerly awaited the publication of the NETS-S (<http://www.iste.org/nets>). In fall 1999, I distributed the standards to all administrators and teachers in my district and stressed that we as a district would be committed to having our students meet them. I then provided schools with the Profiles for Technology Literate Students so they would have a clear idea of the technology competencies students should exhibit at various grade ranges. I gave workshops around the district to guide them and provide them with ways to integrate these technology skills into their existing curriculum. I reminded staff that these skills needed to be reinforced in daily activities that support learning and that the NETS-S represent realistic goals for our students.

As I visited different classrooms and referred to the standards, teachers gave me blank stares. Of course I was discouraged. I wondered if any teachers were using the standards, and if not, how we would ensure that our students were technologically literate. It seemed that if we didn't evaluate our students' competence in technology, we would not be preparing them for the role technology would have in their futures.

## The Problem

I soon realized that expecting teachers to immediately adopt the NETS was unrealistic. Classroom teachers did not see the relevance of these standards to their own teaching and, as a

result, were reluctant to do the extra work required to change what they had been doing for years. In theory, many believed technology was an integral part of student learning, but in practice, it was a different story. Therefore, we needed to devise a system to hold our teachers accountable for integrating technology as well as create a simple process for recording students' progress toward technological competence.

## The Process

I decided to form a committee of interested teachers to reflect on the technology standards in relation to our schools and perhaps write our own district technology standards. First, we scoured the Internet to locate examples of technology standards other schools were using. When we examined our voluminous pile of technology standards, we concluded that most school districts were either using NETS-S or had written technology standards very similar to them.

At this point, we decided that rather than write completely new technology standards, we would expand on the NETS-S, using the same six broad categories and the same grade ranges (PK-2, 3-5, 6-8, 9-12):

1. Basic Operations and Concepts
2. Social, Ethical, and Human Issues
3. Technology Productivity Tools
4. Technology Communications Tools
5. Technology Research Tools
6. Technology Problem-Solving and Decision-Making Tools

What we would do differently is compile the competencies into handy





charts that would be easy for teachers to use.

Each member of the committee took one grade range and drafted a list of competencies for each of the six categories of technology skills. The competencies were realistic skills students could meet as they tackled classroom assignments and activities. That is, they could be assessed by the classroom teacher through technology-integrated activities rather than by the computer teacher. When committee members finished their assignments, they critiqued each other's work, and I then revised the competencies, paying close attention to consistent language throughout the different grade ranges. The chart format really works for our teachers, allowing them to easily indicate each student's progress toward mastery of a skill.

The next step was to ensure that our teachers would use these competencies or we would encounter the same problem in our schools as we did with the NETS. We opted for a rating scale of NE (Not evident), D (Developing), and M (Mastered) for each competency. We would print the charts on card stock and give them out to each homeroom/classroom teacher at the begin-

ISTE Standards for Teachers: Curriculum Planning, Delivery & Assessment

| Competency   | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| <b>BASIC OPERATIONS AND CONCEPTS</b>   |   |   |   |   |   |
| Identify internal and external parts of the computer.                            |   |   |   |   |   |
| Effectively use computer devices such as mouse, keyboard, and scanner.           |   |   |   |   |   |
| Use vocabulary related to computer operation (i.e., cursor, desktop, menu, etc.) |   |   |   |   |   |
| Launch and exit programs from the desktop, CD-ROM, etc.                          |   |   |   |   |   |
| Be able to load from and save onto various sources (floppy, CD, folder, etc.)    |   |   |   |   |   |
| Begin to solve simple operating problems.  |   |   |   |   |   |
| Uses correct fingering position on the keyboard.                                 |   |   |   |   |   |
| Is able to achieve a typing speed of 10 wpm.                                     |   |   |   |   |   |
| Is able to achieve a reasonable accuracy.  |   |   |   |   |   |
| <b>HUMAN ISSUES</b>  |   |   |   |   |   |
| Understand the impact of computer  |   |   |   |   |   |

Student Name \_\_\_\_\_  
School Name \_\_\_\_\_

**KEYS TO RATING SCALE:**  
NE \_\_\_\_\_ Not Evident  
D \_\_\_\_\_ Developing  
M \_\_\_\_\_ Mastered

**BASIC OPERATIONS AND CONCEPTS**

|   | K | 1 | 2 |
|---|---|---|---|
| is able to turn computer on/off properly  |   |   |   |
| is able to identify the basic parts of the computer (e.g., monitor, CPU, etc.)          |   |   |   |
| successfully uses computer devices such as mouse, keyboard and pointer                  |   |   |   |
| uses basic vocabulary related to computer operation (e.g., cursor, desktop, menu, etc.) |   |   |   |
| is able to open and close an application  |   |   |   |
| Correctly uses command keys (e.g., space bar, enter, etc.)                              |   |   |   |
| Locates letters and numbers on the keyboard   |   |   |   |
| is able to save files/work onto a floppy/disk/flash drive, etc.                         |   |   |   |

**SOCIAL, ETHICAL & HUMAN ISSUES**

|   | K | 1 | 2 |
|---|---|---|---|
| Prohibit responsible use of computer equipment and software                       |   |   |   |
| Work cooperatively and collaboratively with other students on technology projects |   |   |   |
| Understands and observes the District Computer Use/Internet Safety Agreement      |   |   |   |
| Understands that people own what they create and it is wrong to copy freely       |   |   |   |
| is respectful of others when using and sharing equipment and resources            |   |   |   |

Teachers completing this evaluation: \_\_\_\_\_  
Kindergarten \_\_\_\_\_ First grade \_\_\_\_\_  
Date \_\_\_\_\_ Date \_\_\_\_\_

**Albany Diocese Technology Competencies for Grades K-2**

**TECHNOLOGY PRODUCTIVITY TOOLS**

|  | K | 1 | 2 |
|--|---|---|---|
| Produces short documents using a word processing program                                     |   |   |   |
| is able to create a simple slideshow using <i>Microsoft® PowerPoint</i> or <i>PowerPoint</i> |   |   |   |
| is able to insert a graphic into a document or slide (text)                                  |   |   |   |
| is able to create a simple graph or chart using data-gathering software                      |   |   |   |
| is able to use paint tools to create a picture (art project)                                 |   |   |   |

**TECHNOLOGY COMMUNICATION TOOLS**

|   | K | 1 | 2 |
|---|---|---|---|
| Has an understanding of e-mail  |   |   |   |
| uses a word processing program to write a short letter or make a poster with graphics |   |   |   |
| Understands how technology tools can be used to communicate information to others     |   |   |   |

**TECHNOLOGY RESEARCH TOOLS**

|   | K | 1 | 2 |
|---|---|---|---|
| Uses age-appropriate software to obtain information                   |   |   |   |
| uses electronic encyclopedia with assistance                          |   |   |   |
| is able to access web sites via bookmarks, favorites, or address book |   |   |   |

**TECHNOLOGY PROBLEM-SOLVING AND DECISION-MAKING TOOLS**

|  | K | 1 | 2 |
|--|---|---|---|
|  |   |   |   |

Competency cards by grades allow teachers to assess their students on the technology competencies. See the elementary-level cards on this page and the secondary level cards on p. 13. The cards remain in students' permanent records for future teachers to view and see what skills their students already know and to show student progress on necessary technology skills.

ning of the school year. A yellow card would have K-2 competencies on one side and 3-5 on the other. A blue card would have 6-8 on one side and 9-12 on the other. We would instruct teachers to complete a student's card by the end of the school year and to store the card in the student's permanent record folder so it could be passed on to his or her teacher the following September. This procedure would repeat itself until both sides of the card were filled out.

Before we printed the cards, we sent a draft version and a survey to a sampling of teachers at all grade ranges. We needed to ascertain if there were any problems with language, comprehensibility, and level of difficulty. When the surveys were returned, we were fortunate to only need to make minor changes before we were ready to distribute the competency cards to all schools in fall 2003.

### The First Year

I presented the new student technology competencies to the Superinten-

dent's Advisory Council, a small group of building principals representing different regions of the district. I explained both the rationale behind the competencies and the procedure for completing them. The principals were cautioned that although their schools may have computer teachers who teach all the students in a lab setting, it will be the classroom teacher's job to fill out the card for each student. If needed, the classroom teacher could ask for assistance from the computer

teacher the first year. I stressed that it would not be advisable to have the computer teacher fill out cards for the entire student body. The goal of the competencies is to help the classroom teacher better use technology as a tool to enhance student learning!

Throughout the first year, I referred to and supported these student competencies whenever I visited classrooms and at any workshop I offered. At each computer teacher forum (a gathering of the computer teachers

Student Name \_\_\_\_\_  
School Name \_\_\_\_\_

**KEYS TO RATING SCALE:**  
NE \_\_\_\_\_ Not Evident  
D \_\_\_\_\_ Developing  
M \_\_\_\_\_ Mastered

**BASIC OPERATIONS AND CONCEPTS**

|  | 3 | 4 | 5 |
|--|---|---|---|
| is able to identify internal and external parts of the computer                                    |   |   |   |
| Successfully uses computer devices such as mouse, keyboard, and pointer                            |   |   |   |
| uses vocabulary related to computer operation (e.g., cursor, desktop, menu, etc.) and the internet |   |   |   |
| Launches and runs programs from the desktop, CD-ROM, etc.  |   |   |   |
| is able to load font and save only values within a program (e.g., font, color, etc.)               |   |   |   |
| Begin to create simple working programs  |   |   |   |
| Use correct fingerings position on the keyboard  |   |   |   |
| is able to achieve a typing speed of 10wpm with reasonable accuracy                                |   |   |   |

**SOCIAL, ETHICAL & HUMAN ISSUES**

|   | 3 | 4 | 5 |
|---|---|---|---|
| Prohibit responsible use of computer equipment and software                         |   |   |   |
| Work cooperatively and collaboratively with other students on technology projects   |   |   |   |
| Understands and observes the District Computer Use/Internet Safety Agreement        |   |   |   |
| Understands and observes copyright law  |   |   |   |
| Understands the dangers associated with technology such as viruses, spy worms, etc. |   |   |   |
| is respectful of others when using and sharing equipment and resources              |   |   |   |

Teachers completing this evaluation: \_\_\_\_\_  
Third grade \_\_\_\_\_ Fourth grade \_\_\_\_\_ Fifth grade \_\_\_\_\_  
Date \_\_\_\_\_ Date \_\_\_\_\_ Date \_\_\_\_\_

**Albany Diocese Technology Competencies for Grades 3-5**

**TECHNOLOGY PRODUCTIVITY TOOLS**

|   | 3 | 4 | 5 |
|---|---|---|---|
| Compares, with assistance, short documents using a word processing program  |   |   |   |
| is able to create a 5-10 slide slideshow with sound effects, graphics using <i>Microsoft® PowerPoint</i> or <i>PowerPoint</i> |   |   |   |
| uses a scanner or digital camera with assistance, to obtain pictures  |   |   |   |
| is able to create a simple spreadsheet and a presentation   |   |   |   |
| is able to use paint tools to create more complicated graphics  |   |   |   |

**TECHNOLOGY COMMUNICATION TOOLS**

|   | 3 | 4 | 5 |
|---|---|---|---|
| is able to word, write, and send a note   |   |   |   |
| Uses a word processing program to write letters, reports, and create posters        |   |   |   |
| Understands which technology tools can be used to communicate information to others |   |   |   |

**TECHNOLOGY RESEARCH TOOLS**

|   | 3 | 4 | 5 |
|---|---|---|---|
| Uses age-appropriate software to obtain information   |   |   |   |
| Continues to use electronic encyclopedia and other electronic resources to obtain information |   |   |   |
| is able to access a web site and navigate through the site on the fly                         |   |   |   |

**TECHNOLOGY PROBLEM-SOLVING AND DECISION-MAKING TOOLS**

|  | 3 | 4 | 5 |
|--|---|---|---|
| uses a variety of technology resources to solve a problem or make a decision |   |   |   |
| Understands which technology resources can be used to make better decisions  |   |   |   |



from the individual schools held several times throughout the school year), I solicited progress reports on the status of the competencies. As I thought, many of the computer teachers feared they would be completing all the cards in June. Some of the computer teachers had not seen the competency cards. Many of them even wondered whether the classroom teachers had seen the cards. However, the classroom teachers filled out the cards as required.

## Evaluation

At the end of the 2003–04 school year, I sent a survey to all teachers to receive feedback on several issues:

- How much time did each competency card require to fill out?
- Did teachers fill it out alone or with another teacher?
- What were the strengths and weaknesses of the competencies?
- How did they think these competencies would help them integrate technology into their curriculum?

From the 400 teachers to whom I sent the survey, I received responses from 43 K–2 teachers, 31 grade 3–5 teachers, 24 grade 6–8 teachers, and 13 grade 9–12 teachers. Sixty-three percent of the respondents indicated that it took less than 10 minutes to complete one competency card, and 44% reported that they completed the competencies alone.

Student Name \_\_\_\_\_  
School Name \_\_\_\_\_

KEYS TO RATING SCALE:  
N: \_\_\_\_\_ Not Noted  
D: \_\_\_\_\_ Developing  
M: \_\_\_\_\_ Mastered

**BASIC OPERATIONS AND CONCEPTS**

|   | N | D | M |
|---|---|---|---|
| is able to define and use standard computer vocabulary                                |   |   |   |
| independently operates school computers and uses the software and e-mail features     |   |   |   |
| is able to save documents and save onto the hard drive or floppy disk                 |   |   |   |
| with assistance, develops strategies for saving common hardware and software problems |   |   |   |
| uses correct finger position on the keyboard  |   |   |   |
| is able to achieve a typing speed of at least 20 wpm with reasonable accuracy         |   |   |   |

**SOCIAL, ETHICAL & HUMAN ISSUES**

|   | N | D | M |
|---|---|---|---|
| Proves responsible use of computer equipment and software   |   |   |   |
| Works cooperatively and collaboratively with other students on technology projects  |   |   |   |
| Observes the District Computer Use/Internet Safety Agreement  |   |   |   |
| Demonstrates an understanding of copyright by citing sources in papers, projects, and presentations                               |   |   |   |
| Understands the changes associated with technology such as viruses, chat rooms, etc.  |   |   |   |
| Understands the importance of the impact of technology on society as well as consumers' responsibility for safe use of technology |   |   |   |
| Recognizes the value of using and storing documents and resources   |   |   |   |

Teachers completing this card: \_\_\_\_\_  
Date: \_\_\_\_\_

**Albany Diocese Technology Competencies for Grades 4-8**

**TECHNOLOGY PRODUCTIVITY TOOLS**

|  | N | D | M |
|--|---|---|---|
| uses word processing guidelines for classroom assignments and projects   |   |   |   |
| creates a table or menu when multimedia presentations for classroom assignments and projects                       |   |   |   |
| uses spreadsheets and other programs to report data and graphics for classroom assignments and projects            |   |   |   |
| is able to create a pie chart, bar graph, or line graph from data on spreadsheet relevant to classroom assignments |   |   |   |
| is able to create a database and query the information   |   |   |   |

**TECHNOLOGY COMMUNICATION TOOLS**

|  | N | D | M |
|--|---|---|---|
| is able to send, edit, and send e-mail   |   |   |   |
| uses a word processing program to write letters, reports, and to create projects   |   |   |   |
| understands which technology tool can be used to communicate information to others |   |   |   |

**TECHNOLOGY RESEARCH TOOLS**

|  | N | D | M |
|--|---|---|---|
| uses age appropriate software to obtain information  |   |   |   |
| uses electronic encyclopedia and other research resources to obtain information and begin to evaluate the information found on the web |   |   |   |
| uses search engines to locate a web site in order to obtain information for a classroom assignment                                     |   |   |   |

**TECHNOLOGY PROBLEM SOLVING AND DECISION MAKING TOOLS**

|  | N | D | M |
|--|---|---|---|
| selects and uses technology tools to correct |   |   |   |

Student Name \_\_\_\_\_  
School Name \_\_\_\_\_

KEYS TO RATING SCALE:  
N: \_\_\_\_\_ Not Noted  
D: \_\_\_\_\_ Developing  
M: \_\_\_\_\_ Mastered

**BASIC OPERATIONS AND CONCEPTS**

|  | N | D | M |
|--|---|---|---|
| uses criteria and computer technology related to planning systems, the network, networks, etc. |   |   |   |
| independently operates school computers and uses software to solve problems                    |   |   |   |
| is able to save common hardware and software problems  |   |   |   |
| is able to word process or spread of at least 20 wpm with reasonable accuracy                  |   |   |   |

**SOCIAL, ETHICAL & HUMAN ISSUES**

|   | N | D | M |
|---|---|---|---|
| Proves responsible use of computer equipment and software   |   |   |   |
| Works cooperatively and collaboratively with other students on technology projects  |   |   |   |
| Observes the District Computer Use/Internet Safety Agreement  |   |   |   |
| Demonstrates an understanding of copyright by citing sources in papers, projects, and presentations                               |   |   |   |
| Understands the changes associated with technology such as viruses, chat rooms, etc.  |   |   |   |
| Understands the importance of the impact of technology on society as well as consumers' responsibility for safe use of technology |   |   |   |
| Recognizes the value of using and storing documents and resources   |   |   |   |

Teachers completing this evaluation: \_\_\_\_\_  
Date: \_\_\_\_\_

**Albany Diocese Technology Competencies for Grades 9-12**

**TECHNOLOGY PRODUCTIVITY TOOLS**

|  | N | D | M |
|--|---|---|---|
| uses word processing guidelines for classroom assignments and projects   |   |   |   |
| creates a table, design and create multimedia presentations for classroom assignments and projects                 |   |   |   |
| uses spreadsheets and other programs to report data and graphics for classroom assignments and projects            |   |   |   |
| is able to create a pie chart, bar graph, or line graph from data on spreadsheet relevant to classroom assignments |   |   |   |
| is able to create a database and query the information   |   |   |   |

**TECHNOLOGY COMMUNICATION TOOLS**

|   | N | D | M |
|---|---|---|---|
| Needs, writes and sends e-mail relevant to classroom assignments and projects |   |   |   |
| uses a word processing program to complete classroom assignments and projects |   |   |   |
| Understands the use of various software for communication and social media    |   |   |   |

**TECHNOLOGY RESEARCH TOOLS**

|  | N | D | M |
|--|---|---|---|
| Conducts online research and evaluates the information for validity, objectivity, content, and accuracy                                  |   |   |   |
| Researches, creates, updates, and presents classroom assignments and projects related to the content using a variety of technology tools |   |   |   |
| uses a variety of search engines to locate information on the Internet for assignments and projects                                      |   |   |   |

**TECHNOLOGY PROBLEM SOLVING AND DECISION MAKING TOOLS**

|   | N | D | M |
|---|---|---|---|
| is able to troubleshoot and use procedures to solve problems, select the correct tool             |   |   |   |
| selects and use appropriate technology tools to facilitate content, analysis, and data collection |   |   |   |
| uses a spreadsheet, scientific calculator, and graphing calculator for problem solving            |   |   |   |
| uses software to correct records, delete, and delete the information relevant to projects         |   |   |   |

Teachers completing this evaluation: \_\_\_\_\_  
Date: \_\_\_\_\_

In addition to their answers on the closed-ended questions, respondents gave useful anonymous feedback on the strengths and weaknesses of the competency cards, focusing mainly on assessment and technology integration.

Teachers thought the cards were useful tools for assessing students, although not all of them believed the classroom teacher was the appropriate person to assess technology skills. One teacher praised the cards for providing

“a benchmark to evaluate students.” Another said the cards “enabled me to see which students needed additional assistance and in which areas.” A third teacher noted that the cards prepare teachers for their incoming students: it “lets the next teacher know the strengths and weaknesses of each student,” this teacher said. Teachers did not often find it easy to fill out the cards, though. One said, “with only two computers that work, it took con-

stant observation in order to complete every task on the card.” One teacher saw “very little relevance to what the classroom teacher is doing—[the cards] should be for the computer teacher to fill out.” Another teacher commented that “parents would know the answers to some of these competencies better than the classroom teacher would.”

Technology integration was another focus of survey comments. Many teachers noted an increase in their technology use, mentioning WebQuests, graphing calculators, spreadsheets, and electronic presentations as technologies they included more in their teaching. One “tried to tie the competencies to the everyday textbook classwork to achieve a clear overview of what the technology can do.” Another said, “I was not sure what skills should be taught at various levels, and this form helped me to clear this up.” However, not all teachers saw the need for integrating technology competencies into their classrooms. In addition to the previous comments questioning why classroom teachers should be teaching and assessing technology skills, one teacher noted that “classroom teachers need more computer training before they will be comfortable filling out the competency cards.”

### The Second Year

In the 2004–05 academic year, we completed the rollout of the competency cards and put a lot of the lessons we learned from the first year into practice. In September 2004, each school received additional cards for kindergarten, new students, and sixth graders.

Lack of hardware in the classrooms was one of the weaknesses of the competencies teachers mentioned. If additional hardware cannot be obtained through fundraising, grants, and donations, then each teacher needs to find ways to work with the computer

teacher and coordinate learning activities with computer lab time. This can be done in several ways.

Classroom teachers can accompany their students to the lab during computer time rather than using that time as a free period, or they can plan classroom projects with the computer teacher to be completed during the students’ computer time. As the year progressed, not only did classroom teachers find more ways to be part of computer lab activities, but computer teachers also worked together to find more ways to involve classroom teachers in lab work. We also encouraged the computer teachers to help classroom teachers fill out the cards, though not to do it for them.

Another important weakness was the perceived notion that what the teacher does in the classroom is not related to what the student knows how to do on the computer. If the classroom teacher is preparing the student to attend college and to be productive in the workplace of the 21st century, then technology skills do matter. Teachers need to reframe how they think about technology and its relationship to learning. Administrators need to embrace technology integration, as well, and hold teachers accountable. It’s not whether a teacher incorporates technology, but in what ways and how often. We addressed this in multiple ways.

First, we provided curriculum-focused professional development to teachers—for example, a workshop titled “Enhancing the Grade 3–5 Social Studies Curriculum Using Technology”—to help classroom teachers better see the connection between technology and the curriculum. And, because we know that professional development does not apply only to teachers, we provided a summer workshop to principals to help them better understand the process of technology integration and how they can support their teachers.

### Closing Thoughts

We need to remember that student technology competencies merely provide a starting point. Staff development opportunities must be based on these competencies if we want technology to be truly integrated. Second, and more important, our curriculum content needs to be aligned with the technology. Teachers also need examples of exciting projects that they can use/create to integrate technology into their classroom instruction—technology projects for each grade level that show mastery of the subject content area.

Although these competencies are intended for classroom teachers, they can also be helpful to computer teachers as they coordinate technology lessons with the curriculum. The competencies can serve as a guide for individual technology skills to be taught at each grade range and a reminder to include classroom teachers in technology lesson plans.

In March 2005, our district hosted its first technology fair. It was held at a local college, and participants included approximately 120 students and 40 teachers from 23 schools. Students and teachers showcased their curriculum-focused technology projects. The underlying reason for this fair was to support technology integration and, of course, our student technology competencies, and it proved successful in meeting that goal. Because of the fair’s success and the gains we made in our second year using the competencies, we are optimistic that each year more teachers will appreciate the value of the competencies and allow them to become a resource for technology-integrated projects that can be shared with other teachers.



*Darlene Cardillo is the director of educational technology for the schools in the Roman Catholic Diocese of Albany, New York.*